Part 2 (Fuzzy)

Problem (4)

(a) Show that the set $A = \int \frac{\left(\frac{1}{\sqrt{1+5x}}\right)}{x}$ is convex

(b) Consider the fuzzy sets F and G defined in interval [0,10] by the memberships $\mu_F = 2^{-x}$ and $\mu_G = \frac{1}{1+10(x-2)^2}$. Determine the mathematical formulas and graphs of

memberships functions of (i) $\mu_{\bar{F}}$ and $\mu_{\bar{G}}$ (ii) $\mu_{F \cup G}$ and $\mu_{F \cap G}$

(c) Find sup(A), center of A, height of A and relative cardinality of ($\|A\|$) where A is fuzzy set $A = \frac{0.2}{a} + \frac{0.3}{b} + \frac{0.6}{c} + \frac{0.7}{d}$

Problem (5)

(a) Let $A = \int \frac{\mu_A(x)}{x}$, $B = \int \frac{\mu_B(x)}{x}$ be fuzzy sets with memberships
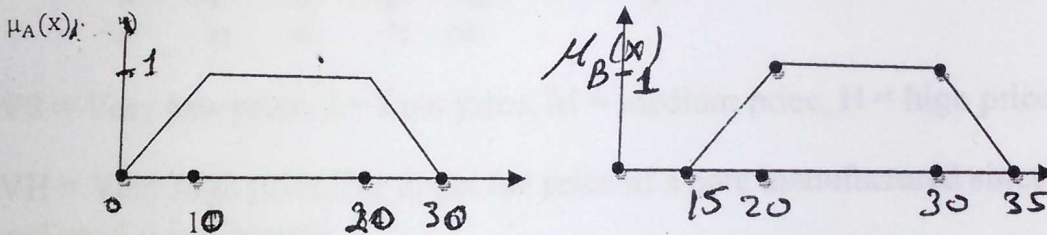
aggregate two fuzzy sets to defuzzificate it to single most nearly value by centriod method

(b) A product with memberships represents, degree of high expensive $\mu_A(x)$, degree of medium expensive $\mu_B(x)$ and degree of cheap expensive $\mu_c(x)$. Us defuzzification methods to find suitable price, if its medium degree is 0.5 and high degree 0.8 where
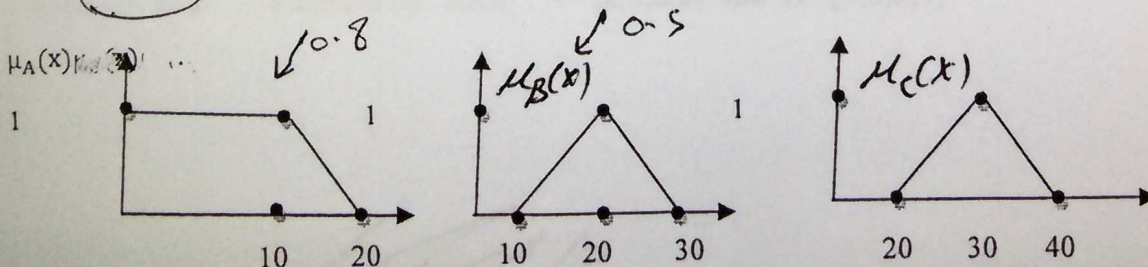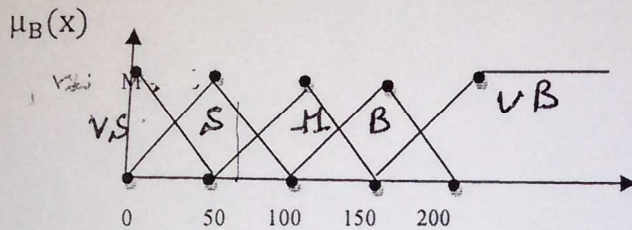

(c) A fuzzy system constructed to get the price of a car type with respect to car age and distance. The manufactured data say that this system has two inputs that are age and
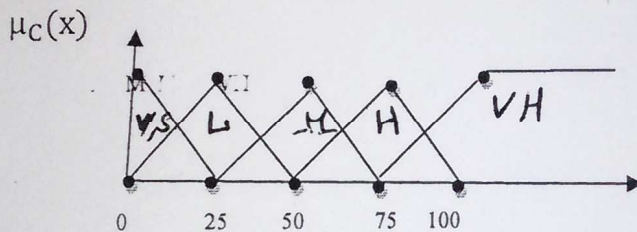
used distance, one output which is car price, where $\mu_A(x)$, $\mu_B(x)$ and $\mu_C(x)$ are memberships represents car age, used distance by care and price with thousands

$\mu_A(x)$
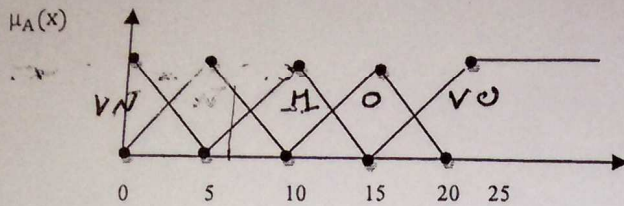
VN= Very new, N= new, M = medium, O = old, VO = Very old

$\mu_B(x)$

VS = Very small, S= Small, M = medium, B = Long , VB = Very Long

$\mu_C(x)$

VS = Very low price, L= Low price, M = medium price, H = high price ,

VH = Very high price. Try to get the price of a care manufactured since 6 year ago and used it in distance

80000 km .

(d) The fuzzy matrices is as follows

$$M_R = \begin{bmatrix} 0 & 0 & .8 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & .9 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix} \qquad M_S = \begin{bmatrix} 0 & 0 & .8 & 0 \\ 1 & 0 & 0 & 0 \\ 0 & .9 & 0 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix}$$

Find fuzzy relation matrices $M_{R \cup S}$ $M_{R \cap S}$ and $M_{R \circ S}$ corresponding $R \cup S, R \cap S$ and $R \circ S$,where R and S subsets of $A X B$, A={a,b,c,d} and B={1,2,3,4}

part 2